

Amendment and Response

Applicant: Gerold Gruendler et al.

Serial No.: 10/598,285

Filed: June 21, 2007

Docket No.: I431.174.101/FIN565PCT/US

Title: COOLING SYSTEM FOR DEVICES HAVING POWER SEMICONDUCTORS AND METHOD FOR COOLING THE DEVICE

REMARKS

The following remarks are made in response to the Non-Final Office Action mailed May 4, 2009. Claims 1-9, 12, 13, 20, 21, and 29 were previously cancelled without prejudice. Claims 10, 11, 14-19, 22-28 and 30-39 were rejected. Claims 17 and 22 were objected to. With this Response, claims 10, 17, 18, 22, 26, and 27 have been amended. Claims 10, 11, 14-19, 22-28 and 30-39 remain pending in the application and are presented for reconsideration and allowance.

Claim Objections

Claims 17 and 22 are objected to because of informalities.

With this Response, claims 17 and 22 have been amended so as to correct the identified informalities. As such, Applicants respectfully request that the objections to claims 17 and 22 be withdrawn.

Claim Rejections under 35 U.S.C. § 102

Claims 18, 22, 27, 31-33 and 38 were rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 6,278,610 to Yasufuku et al. ("Yasufuku").

Applicants respectfully submit that Yasufuku fails to anticipate the power semiconductor device as defined by amended independent claim 18. Yasufuku describes a connector 200 for connecting a module 100, including a board 110 having semiconductor chips thereon, to a printed circuit board 300 (Figure 1; Col. 5, lines 39-42 and 59-61). Connector 200 includes a connector body 110 having a receiving part 211 with contacts 212a and 212b into which module 100 is inserted, and a cover 220 which is connected in a pivotable fashion to connector body 210 by a hinged connection 221, the cover including a pivotable heat sink 230 (Figure 6B; Col. 6, Lines 10-20). Connector 200 is mounted to printed circuit board 300, such as by soldering (Col. 8, lines 32-37).

In view of the above, Yasufuku fails to teach or suggest **a cooling plate mounted in a pivotable manner to a plug-in contact strip of a superordinate carrier**, as defined by

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amended independent claim 1. Instead, Yasufuku describes a heat sink which is connected in a pivotable fashion to connector body 210 which, in turn, is soldered to printed circuit board 300.

Additionally, the Office Action respectively equates heat sink 230 and the cooling fins thereof with the **cooling plate** and **cooling grid structure** of amended independent claim 18. However, as illustrated by Figure 4, the cooling fins cover the entire area on the top side of heat sink 230 such that the cooling fins must necessarily cover the any area or devices covered by heat sink 230. Therefore, since heat sink 230 covers all semiconductor chips 120 (whatever type they may be) of module 100 and areas of board 110 therebetween and surrounding semiconductor chips 120, so must the cooling fins of heat sink 230 also cover the identical areas of board 110. As such, Applicants respectfully submit that Yasufuku also fails to teach or suggest that **the cooling plate is pressed directly onto and covers only the power semiconductor component while the cooling grid structure does not contact or cover the power semiconductor component but covers at least a portion of only the plurality of other semiconductor components**, as further defined by amended independent claim 18.

In view of the above, Applicants respectfully submit that Yasufuku fails to teach or suggest the semiconductor device as defined by amended independent claim 18. As such, Applicants respectfully request that the rejection of independent claim 18 under 35 U.S.C. 102 over Yasufuku be withdrawn and that independent claim 18 be allowed.

Amended independent claim 27 includes limitations similar to those described above with respect to independent claim 18. As such, for at least reasons similar to those remarked upon above with respect to independent claim 18, Applicants respectfully request that the rejection of independent claim 27 under 35 U.S.C. 102 over Yasufuku also be withdrawn and that independent claim 27 be allowed as well.

Further, since claims 22, 31, and 32 further define patentably distinct independent claim 18, and claims 33 and 38 further define patentably distinct independent claim 27, Applicants respectfully request that the rejections of dependent claims 22, 31-33, and 38 under 35 U.S.C. 102 over Yasufuku also be withdrawn and that dependent claims 22, 31-33, and 38 be allowed as well.

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Claim Rejections under 35 U.S.C. § 103

Claims 10, 14, 30 and 34-37 were rejected under 35 U.S.C. 103(a) as being unpatentable over Yasufuku in view of US Patent Publication No. 2006/0067054 to Wang et al. (“Wang”).

Claims 11, 15-17, 19, 23-25, 26, 28 and 39 were rejected under 35 U.S.C. 103(a) as being unpatentable over Yasufuku in view of Wang et al. as applied to claim 10 above, and Yasufuku alone as applied to claims 18 and 27 above, and further in view of US Patent No. 6,775,139 to Hsueh (“Hsueh”).

Independent claims 10 and 26 each include limitations similar to those described and remarked upon above with respect to independent claim 18. As such, Applicants respectfully submit that Yasufuku cannot be combined with Wang to teach or suggest the cooling system as defined by independent claim 10, and cannot be combined with Wang and Hsueh to teach or suggest the method of cooling a device as defined by independent claim 26. As such, Applicants respectfully request that the rejections of independent claims 10 and 26 under 35 U.S.C. 103 be withdrawn and that independent claims 10 and 26 be allowed.

Claims 11, 14-17, 30, and 34-37 further define patentably distinct independent claim 10, claims 19 and 23-25 further define patentably distinct independent claim 18, and claims 28 and 39 further define patentably distinct independent claim 27. As such, Applicants respectfully request that the rejections of dependent claims 11, 14-17, 19, 23-25, 28, 30, 34-37, and 39 under 35 U.S.C. 103 also be withdrawn and that dependent claims 11, 14-17, 19, 23-25, 28, 30, 34-37, and 39 be allowed as well.

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CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 10, 11, 14-19, 22-28 and 30-39 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 10, 11, 14-19, 22-28 and 30-39 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Steven E. Dicke at Telephone No. (612) 573-2002, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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